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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/624,385	07/27/2000	Tatsushi Katayama	35.G2626	9572

5514 7590 06/22/2004

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EXAMINER	
WANG, JIN CHENG	
ART UNIT	**PAPER NUMBER**
2672	17

DATE MAILED: 06/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/624,385	Applicant(s) KATAYAMA ET AL.	
	Examiner Jin-Cheng Wang	Art Unit 2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,5-8,11-13 and 26-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2, 5-8, 11-13, 26-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 05/06/2004 has been entered. Claims 1, 6, and 11, and 26-28 have been amended. Claim 29 has been newly added. Claims 3-4; 9-10, and 14-25 have been canceled. Claims 1-2, 5-8, 11-13, 26-29 are pending in the application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-2, 5-8, 11-13, 26-29 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 1 recites "a plane mapping mode" which is not enabled by the specification because the specification instead describes "a planar mapping mode". Claim 2 and 5 depend upon the claim 1 and are rejected due to their dependency on the claim 1.

Claim 6 recites "a plane mapping mode" which is not enabled by the specification because the specification instead describes "a planar mapping mode". Claim 7-8 depend upon the claim 6 and are rejected due to their dependency on the claim 6.

Claim 11 recites "a plane mapping mode" which is not enabled by the specification because the specification instead describes "a planar mapping mode". Claim 12-13 depend upon the claim 11 and are rejected due to their dependency on the claim 11.

Each of the claims 26-29 recites "a plane mapping mode" which is not enabled by the specification because the specification instead describes "a planar mapping mode".

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-2, 5-8, 11-13, 26-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim 1 recites "a plane mapping mode" which is ambiguous because "a plane mapping mode" is not found in the specification. The page 41 of the specification recites "a planar mapping mode" which itself is not clearly defined. Claim 2 and 5 depend upon the claim 1 and are rejected due to their dependency on the claim 1.

The claim 6 recites "a plane mapping mode" which is ambiguous because "a plane mapping mode" is not found in the specification. Claim 7-8 depend upon the claim 6 and is rejected due to their dependency on the claim 6.

The claim 11 recites "a plane mapping mode" which is ambiguous because "a plane mapping mode" is not found in the specification. Claim 12-13 depend upon the claim 11 and is rejected due to their dependency on the claim 11.

Each of the claims 26-29 recites "a plane mapping mode" which is ambiguous because "a plane mapping mode" is not found in the specification.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-2, 5-8, 11-13, and 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xiong et al. U.S. Patent No. 6,434,265 (hereinafter Xiong), and further in view of Shum et al. U.S. Patent No. 6,271,855 (hereinafter Shum) and Teo U.S. Patent No. 6,246,413 (Teo).

8. Claim 1:

(a) Xiong teaches an image synthesis method comprising:

An input step, of inputting a plurality of image data (e.g., column 9, lines 20-30);

A placement information generating step, of generating placement information determined by a placement order of all images inputted in the input step (e.g., column 16, lines 35-45);

A placement information obtaining step of obtaining placement information about a plurality of images in which adjacent images have a common subject region (e.g., in column 4, lines 5-40, Xiong teaches a method for constructing a panorama from rectilinear images in 3D

through *projective registration and calibration* including: (1) the projective registrations of overlapping images, (2) calibration and global optimization of these images, a self calibration in which 2D image planes are positioned as 3D planes in space);

A setting step of setting one mapping mode out of a plurality of mapping modes each corresponding to a different mapping surface in accordance with the obtained placement information (e.g., in column 8, lines 18-58 of Xiong, it is stated that "overlapping photographs are analyzed to determine what orientation the photographs were taken in order to establish a common ground for subsequent operations and the panorama is constructed *on a particular geometry* that will *best* facilitate the rendering of the projection of the panorama onto *a chosen viewing plane* for viewing". The Xiong discloses some typical geometry on which panoramas are formed; In column 8, lines 18-58, Xiong further discloses that panorama is constructed on a particular geometry that will best facilitate the rendering of the projection *onto a chosen viewing plane* such as cubic, polyhedral, cylindrical and spherical geometries); and

A synthesis step of combining the plurality of images by using the mapping mode set in the setting step (e.g., in column 4, lines 5-40 of Xiong, it is stated that the composing or blending in which images are ready to be re-projected to a 3D environment map with pixels in overlap regions being composed from multiple; In column 8, lines 18-58, Xiong further teaches that overlapping photographs are analyzed to determine what orientation the photographs were taken in order to establish a common ground for subsequent operations and the panorama is constructed on a particular geometry that will best facilitate the rendering of the projection of the panorama onto a chosen viewing plane for viewing. The Xiong further discloses some typical geometry on which panoramas are formed);

A changing step, of changing the mapping mode (In column 4, lines 40-50, it is stated that "the projection module may be controlled through the user interface 230 as well, to allow a user to select what geometry will be projected onto". Therefore, Xiong teaches a changing step through the user interface 230 by selecting a geometric surface out of a plurality of geometric surfaces each corresponding to a different mapping surface).

- The Examiner interprets "a placement information obtaining step of obtaining placement information about a plurality of images in which adjacent images have a common subject region" as an automatic registration and calibration step of registering the overlapping images and capturing common overlapping areas between overlapping images and minimizing the average squared pixel intensity difference with respect to certain transformation parameters.
- The Examiner interprets the mapping mode as mapping images onto a geometric surface such as a planar or a cylindrical surface (Applicant's specification, page 1, lines 20-25). Accordingly, the Examiner interprets the setting step of setting a mapping mode as the selecting step of selecting a geometric surface. In column 8, lines 18-58, Xiong discloses that panorama is constructed on a particular geometry that will best facilitate the rendering of the projection *onto a chosen viewing plane* (a geometric surface) such as cubic, polyhedral, cylindrical and spherical geometries. In column 4, lines 40-50, it is stated that "the projection module may be controlled through the user interface 230 as well, to allow a user to select what geometry will be projected onto". Therefore, Xiong teaches a selecting step of selecting a geometric surface out of a plurality of geometric

surfaces each corresponding to a different mapping surface in accordance with the obtained placement information. As applied to the present application, Xiong fulfills the claimed limitation of a setting step of setting one mapping mode out of a plurality of mapping modes each corresponding to a different mapping surface in accordance with said obtained placement information.

(b) However, Xiong is silent to "a setting step, of *automatically* setting one mapping mode out of a plurality of mapping modes each corresponding to a different mapping surface in accordance with the obtained placement information."

(c) Teo teaches the claim limitation of 1) a setting step, of *automatically* setting one mapping mode out of a plurality of mapping modes each corresponding to a different mapping surface in accordance with the obtained placement information (Teo teaches manipulating (adjusting the scale of the polyhedral surface, rotating the surface, re-positioning edges of the polyhedral surfaces) a polyhedral surface upon which the scene is to be projected, relative to the initial panoramic image, to form a desired surface, wherein the desired surface is distinct from the initial surface and modifying the initial panoramic image by mapping points on the desired surface to corresponding points on the initial surface to produce a modified panoramic image corresponding to projection of the scene onto the desired surface. Teo therefore teaches *automatically* setting a mapping mode by the computer through a user interface);

(d) It would have been obvious to one of ordinary skill in the art to have incorporated the Teo's setting step because Xiong also teaches a user interface for setting a mapping surface by the computer and therefore Xiong suggests automatically setting a mapping mode.

(e) One having the ordinary skill in the art would have been motivated to do this because setting a mapping mode out from a plurality of mapping mode serves for the purpose of eliminating visible artifacts (Teo column 10).

(f) However, Xiong and Teo are silent to issuing warning wherein the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view when a cylindrical mapping mode is changed to a plane mapping mode in the claim limitation of "a generating step, of issuing, when an image formed by changing the mapping mode in the changing step does not comply with a predetermined condition set in accordance with the mapping mode, a warning and generating a synthesized image in accordance with the predetermined condition, the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view when a cylindrical mapping mode is changed to a plane mapping mode" (i.e., generation of a warning message).

(g) Shum implicitly teaches issuing warning wherein the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view when a cylindrical mapping mode is changed to a plane mapping mode in the claim limitation of "a generating step, of issuing, when an image formed by changing the mapping mode in the changing step does not comply with a predetermined condition set in accordance with the mapping mode, a warning and generating a synthesized image in accordance with the predetermined condition, the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view when a cylindrical mapping mode is changed to a plane mapping mode" (e.g., Shum teaches determining the constraints governing the mapping mode of the mapping onto the projection plane wherein the constraints incorporates the predetermined angle of view or the predetermined

camera orientation matrix by the governing linear systems of equations. Shum further teaches generating a warning message to indicate that the constraint equations are unsolvable in a case in which the synthesized image is not aligning with any portion of the projected model when the projection plane is changed or when the angle of view is changed, e.g., the projection plane is changed from a cylindrical plane to a spherical plane or the angle of view has changed. When the linear systems of equations are not solvable, a user can switch the mapping mode to meet the constraint equations requirements by changing the plane normals. Moreover, the projection space can be in the form of any shape such as spherical or cylindrical and by changing the camera's point of view and the coordinates and directions of the plane normals, the projection space is effectively changed and thereby the mapping mode is changed. See column 13-22).

(h) It would have been obvious to one of ordinary skill in the art to have incorporated the Shum's warning message generation step because Xiong suggests a generating step of generating a synthesized image in accordance with the predetermined condition (Xiong column 3, lines 35-55; column 17, lines 15-67; column 18, lines 1-4). Moreover, Xiong teaches in figures 2 and 3 a user interface and a global optimization that provides feedback to the computer system such as issuing warning messages on the computer monitor 218 when the pair-wise objective function is not desirable for a poor selection of the projection viewing plane (and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects) due to a poor selection of the projection viewing plane and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects. Xiong also points to a seamless multi-resolution average blending method that would result in an absent of shadow effects (column 14, lines 1-45). Xiong further teaches a human interaction being present throughout the image

synthesis process to provide feedback to the computer system in all the nonlinear optimizations to let users monitor the progress of the system and allow them to intervene when necessary and therefore the claimed limitation suggests an obvious modification of Xiong because providing feedback to users is similar to issuing a message to users in a user interaction with the nonlinear optimizations when the changing step does not comply with a predetermined condition set or user-selected parameter set.

(i) One having the ordinary skill in the art would have been motivated to do this because this would have provided the user the informative message such as issuing a warning message through the user interaction when convergence to the predetermined condition setting cannot be obtained in the image synthesis (Xiong column 17, lines 15-67, column 18, lines 1-4) for non-solvable optimization problems (Shum column 18, lines 38-67).

Claim 2:

Claim 2 recites all the limitations of claim 1 and adds the limitation of "a focal length obtaining step." Xiong teaches finding projective parameters such as 3D rotation parameters (pan, tilt roll), center of projection of images, ratio of focal lengths, and the like (column 10, lines 9-28). Xiong implicitly teaches finding the camera internal parameters vector of which the focal length is a component (column 11, lines 15-42).

Claim 5:

The claim 5 recites all the limitations of claim 1 and adds the limitation of "a displaying step of displaying a cuttable rectangular region." Xiong teaches how to align images more

precisely by changing the coordinates for positioning an image. Xiong further teaches placing the images 1210 at selected tangents on the viewing sphere 1220 (figure 12, and column 17, lines 12-65).

9. Claim 6:

The claim 6 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of "an image synthesis apparatus" and "a displaying step of displaying a cuttable rectangular region". However, Xiong further discloses in figure 3 an apparatus for image synthesis. Xiong teaches how to align images more precisely by changing the coordinates for positioning an image. Xiong further teaches placing the images 1210 at selected tangents on the viewing sphere 1220 (figure 12, and column 17, lines 12-65).

Claim 7:

The claim 7 recites all the limitations of claim 6 and adds the limitation of "a focal length obtaining step." The Xiong reference teaches finding projective parameters such as 3D rotation parameters (pan, tilt roll), center of projection of images, ratio of focal lengths, and the like (column 10, lines 9-28). Xiong implicitly teaches finding the camera internal parameters vector in his image synthesis apparatus of figure 3 because the focal length is a component of that vector (column 11, lines 15-42).

Claim 8:

The claim 8 recites all the limitations of claim 6 and adds the limitation of "a changing step of changing the mapping mode." Xiong teaches that panorama is constructed on a particular

geometry that will best facilitate the rendering of the projection of the panorama onto a chosen viewing plane such as cubic, polyhedral, cylindrical and spherical geometries (column 8, lines 18-58).

10. Claim 11:

The claim 11 encompasses the same scope of invention as that of claim 1 except additional claimed limitation of a computer-readable storage medium having a program for implementing image synthesis method. However, Xiong further discloses the claimed limitation of a computer-readable storage medium having a program for implementing image synthesis method (e.g., in column 3, lines 54-57, it is stated "a program residing in system memory 220 which stores output data and other data").

Claim 12:

The claim 12 recites all the limitations of claim 11 and adds "a focal length obtaining step." Xiong teaches finding projective parameters such as 3D rotation parameters (pan, tilt roll), center of projection of images, ratio of focal lengths, and the like (column 10, lines 9-28). Xiong implicitly teaches finding the camera internal parameters vector of which the focal length is a component (column 11, lines 15-42).

Claim 13:

The claim 13 recites all the limitations of claim 11 and adds the limitation of "a changing step of changing the mapping mode." Xiong teaches that panorama is constructed on a particular geometry that will best facilitate the rendering of the projection of the panorama onto a chosen

viewing plane such as one of the cubic, polyhedral, cylindrical and spherical geometries (column 8, lines 18-58).

11. Claim 26:

(a) Xiong teaches an image synthesis method comprising:

An input step, of inputting a plurality of image data (e.g., column 9, lines 20-30);

A placement information generating step, of generating placement information determined by a placement order of all images inputted in the input step (e.g., column 16, lines 35-45);

A placement information obtaining step of obtaining placement information about a plurality of images in which adjacent images have a common subject region (e.g., in column 4, lines 5-40, Xiong teaches a method for constructing a panorama from rectilinear images in 3D through *projective registration and calibration* including: (1) the projective registrations of overlapping images, (2) calibration and global optimization of these images, a self calibration in which 2D image planes are positioned as 3D planes in space);

A setting step of setting one mapping mode out of a plurality of mapping modes each corresponding to a different mapping surface in accordance with the obtained placement information (e.g., in column 8, lines 18-58 of Xiong, it is stated that "overlapping photographs are analyzed to determine what orientation the photographs were taken in order to establish a common ground for subsequent operations and the panorama is constructed *on a particular geometry* that will *best* facilitate the rendering of the projection of the panorama onto *a chosen viewing plane* for viewing". The Xiong discloses some typical geometry on which panoramas are

formed; In column 8, lines 18-58, Xiong further discloses that panorama is constructed on a particular geometry that will best facilitate the rendering of the projection *onto a chosen viewing plane* such as cubic, polyhedral, cylindrical and spherical geometries); and

A synthesis step of combining the plurality of images by using the mapping mode set in the setting step (e.g., in column 4, lines 5-40 of Xiong, it is stated that the composing or blending in which images are ready to be re-projected to a 3D environment map with pixels in overlap regions being composed from multiple; In column 8, lines 18-58, Xiong further teaches that overlapping photographs are analyzed to determine what orientation the photographs were taken in order to establish a common ground for subsequent operations and the panorama is constructed on a particular geometry that will best facilitate the rendering of the projection of the panorama onto a chosen viewing plane for viewing. The Xiong further discloses some typical geometry on which panoramas are formed);

- The Examiner interprets "a placement information obtaining step of obtaining placement information about a plurality of images in which adjacent images have a common subject region" as an automatic registration and calibration step of registering the overlapping images and capturing common overlapping areas between overlapping images and minimizing the average squared pixel intensity difference with respect to certain transformation parameters.
- The Examiner interprets the mapping mode as mapping images onto a geometric surface such as a planar or a cylindrical surface (Applicant's specification, page 1, lines 20-25). Accordingly, the Examiner interprets the setting step of setting a mapping mode as the

selecting step of selecting a geometric surface. In column 8, lines 18-58, Xiong discloses that panorama is constructed on a particular geometry that will best facilitate the rendering of the projection *onto a chosen viewing plane* (a geometric surface) such as cubic, polyhedral, cylindrical and spherical geometries. In column 4, lines 40-50, it is stated that "the projection module may be controlled through the user interface 230 as well, to allow a user to select what geometry will be projected onto". Therefore, Xiong teaches a selecting step of selecting a geometric surface out of a plurality of geometric surfaces each corresponding to a different mapping surface in accordance with the obtained placement information. As applied to the present application, Xiong fulfills the claimed limitation of a setting step of setting one mapping mode out of a plurality of mapping modes each corresponding to a different mapping surface in accordance with said obtained placement information.

(b) However, Xiong does not implicitly teach "a setting step, of *automatically* setting one mapping mode out of a plurality of mapping modes each corresponding to a different mapping surface in accordance with the obtained placement information."

(c) Teo teaches the claim limitation of a setting step, of *automatically* setting one mapping mode out of a plurality of mapping modes each corresponding to a different mapping surface in accordance with the obtained placement information (Teo teaches manipulating (adjusting the scale of the polyhedral surface, rotating the surface, re-positioning edges of the polyhedral surfaces) a polyhedral surface upon which the scene is to be projected, relative to the initial panoramic image, to form a desired surface, wherein the desired surface is distinct from the initial surface and modifying the initial panoramic image by mapping points on the desired

surface to corresponding points on the initial surface to produce a modified panoramic image corresponding to projection of the scene onto the desired surface. Teo therefore teaches *automatically* setting a mapping mode by the computer through a user interface);

(d) It would have been obvious to one of ordinary skill in the art to have incorporated the Teo's automatically setting step because Xiong teaches a user interface for setting a mapping surface by the computer automatically and therefore Xiong suggests *automatically setting a mapping mode*.

(e) One having the ordinary skill in the art would have been motivated to do this because setting a mapping mode out from a plurality of mapping mode serves for the purpose of eliminating visible artifacts (Teo column 10).

(f) However, Xiong and Teo are silent to issuing warning wherein the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view when a cylindrical mapping mode is changed to a plane mapping mode.

(g) Shum implicitly teaches issuing warning wherein the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view when a cylindrical mapping mode is changed to a plane mapping mode (e.g., Shum teaches determining the constraints governing the mapping mode of the mapping onto the projection plane wherein the constraints incorporates the predetermined angle of view or the predetermined camera orientation matrix by the governing linear systems of equations. Shum further teaches generating a warning message to indicate that the constraint equations are unsolvable in a case in which the synthesized image is not aligning with any portion of the projected model when the projection plane is changed or when the angle of view is changed, e.g., the projection plane is changed from

a cylindrical plane to a spherical plane or the angle of view has changed. When the linear systems of equations are not solvable, a user can switch the mapping mode to meet the constraint equations requirements by changing the plane normals. Moreover, the projection space can be in the form of any shape such as spherical or cylindrical and by changing the camera's point of view and the coordinates and directions of the plane normals, the projection space is effectively changed and thereby the mapping mode is changed. See column 13-22).

(h) It would have been obvious to one of ordinary skill in the art to have incorporated the Shum's warning message generation step because Xiong suggests a generating step of generating a synthesized image in accordance with the predetermined condition (Xiong column 3, lines 35-55; column 17, lines 15-67; column 18, lines 1-4). Moreover, Xiong teaches in figures 2 and 3 a user interface and a global optimization that provides feedback to the computer system such as issuing warning messages on the computer monitor 218 when the pair-wise objective function is not desirable for a poor selection of the projection viewing plane (and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects) due to a poor selection of the projection viewing plane and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects. Xiong also points to a seamless multi-resolution average blending method that would result in an absent of shadow effects (column 14, lines 1-45). Xiong further teaches a human interaction being present throughout the image synthesis process to provide feedback to the computer system in all the nonlinear optimizations to let users monitor the progress of the system and allow them to intervene when necessary and therefore the claimed limitation suggests an obvious modification of Xiong because providing feedback to users is similar to issuing a message to users in a user interaction with the nonlinear

optimizations when the changing step does not comply with a predetermined condition set or user-selected parameter set.

(i) One having the ordinary skill in the art would have been motivated to do this because this would have provided the user the informative message such as issuing a warning message through the user interaction when convergence to the predetermined condition setting cannot be obtained in the image synthesis (Xiong column 17, lines 15-67, column 18, lines 1-4) for non-solvable optimization problems (Shum column 18, lines 38-67).

12. Claim 27:

The claim 27 encompasses the same scope of invention as that of the claim 26 except additional claim limitation of "a displaying step of displaying a cuttable rectangular region." Xiong teaches how to align images more precisely by changing the coordinates for positioning an image. Xiong further teaches placing the images 1210 at selected tangents on the viewing sphere 1220 (figure 12, and column 17, lines 12-65).

13. Claim 28:

The claim 28 encompasses the same scope of invention as that of claim 26 except additional claimed limitation of a computer-readable storage medium having a program for implementing image synthesis method. However, Xiong further discloses the claimed limitation of a computer-readable storage medium having a program for implementing image synthesis method (e.g., in column 3, lines 54-57, it is stated "a program residing in system memory 220 which stores output data and other data").

Claim 29:

The claim 29 encompasses the same scope of invention as that of the claim 1. The claim 29 is subject to the same rationale of rejection set forth in the claim 1.

Remarks

14. Applicant's arguments, filed 05/06/2004, paper number 16, have been fully considered but they are not deemed to be persuasive.

15. Applicant argues in essence with respect to the amended claim 1 and similar claims that:

(A) "Applicants point out that nothing has been found, or pointed out, in Shum that would teach or suggest anything about changing a mapping mode at all...The Examiner's assertion, therefore, appears to be totally incorrect, unless the Examiner's view is that it is somehow 'implicit' in that patent that selection of mapping modes is being discussed, and that that patent somehow 'implicitly' is really concerned with problems encountered upon change of mapping mode. Since such seems self-evidently not to be the case, the rejection is believed to be improper, and its reconsideration and withdrawal are respectfully requested."

In response to the arguments in (A), the Examiner asserts that Shum implicitly teaches issuing warning wherein the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view when a cylindrical mapping mode is changed to a plane mapping. For example, Shum teaches determining the constraints governing the mapping mode of the mapping onto the projection plane wherein the constraints incorporates the predetermined

angle of view or the predetermined camera orientation matrix by the governing linear systems of equations. Shum further teaches generating a warning message to indicate that the constraint equations are unsolvable in a case in which the synthesized image is not aligning with any portion of the projected model when the projection plane is changed or when the angle of view is changed, e.g., the projection plane is changed from a cylindrical plane to a spherical plane or the angle of view has changed. When the linear systems of equations are not solvable, a user can switch the mapping mode to meet the constraint equations requirements by changing the plane normals. Moreover, the projection space can be in the form of any shape such as spherical or cylindrical and by changing the camera's point of view and the coordinates and directions of the plane normals, the projection space is effectively changed and thereby the mapping mode is changed (column 13-22).

It would have been obvious to one of ordinary skill in the art to have incorporated the Shum's warning message generation step because Xiong suggests a generating step of generating a synthesized image in accordance with the predetermined condition (Xiong column 3, lines 35-55; column 17, lines 15-67; column 18, lines 1-4). Moreover, Xiong teaches in figures 2 and 3 a user interface and a global optimization that provides feedback to the computer system such as issuing warning messages on the computer monitor 218 when the pair-wise objective function is not desirable for a poor selection of the projection viewing plane (and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects) due to a poor selection of the projection viewing plane and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects. Xiong also points to a seamless multi-resolution average blending method that would result in an absent of shadow effects (column 14,

lines 1-45). Xiong further teaches a human interaction being present throughout the image synthesis process to provide feedback to the computer system in all the nonlinear optimizations to let users monitor the progress of the system and allow them to intervene when necessary and therefore the claimed limitation suggests an obvious modification of Xiong because providing feedback to users is similar to issuing a message to users in a user interaction with the nonlinear optimizations when the changing step does not comply with a predetermined condition set or user-selected parameter set.

One having the ordinary skill in the art would have been motivated to do this because this would have provided the user the informative message such as issuing a warning message through the user interaction when convergence to the predetermined condition setting cannot be obtained in the image synthesis (Xiong column 17, lines 15-67, column 18, lines 1-4) for non-solvable optimization problems (Shum column 18, lines 38-67).

16. Applicant argues in essence with respect to the amended claim 1 and similar claims that:

(B) "Moreover, considering only what is actually found in Shum '412, the Office Action fails to provide any reason why one of only ordinary skill, provided with the Shum use of a warning where a constraint encountered in the solution of a 3D modeling problem is left unmet, would somehow be motivated to issue a warning upon a certain condition occurring as a result of a change in mapping mode."

In response to the arguments in (B), the Examiner asserts that Shum implicitly teaches issuing warning wherein the warning being issued in a case in which the synthesized image exceeds a predetermined angle of view when a mapping mode is changed. For example, Shum teaches determining the constraints governing the mapping mode of the mapping onto the projection plane wherein the constraints incorporates the predetermined angle of view or the predetermined camera orientation matrix by the governing linear systems of equations. Shum further teaches generating a warning message to indicate that the constraint equations are unsolvable in a case in which the synthesized image is not aligning with any portion of the projected model when the projection plane is changed or when the angle of view is changed, e.g., the projection plane is changed from a cylindrical plane to a spherical plane or the angle of view has changed. When the linear systems of equations are not solvable, a user can switch the mapping mode to meet the constraint equations requirements by changing the plane normals. Moreover, the projection space can be in the form of any shape such as spherical or cylindrical (since any wall, ceiling or floor of the room can be in any shape) and by changing the camera's point of view and the coordinates and directions of the plane normals, the projection space is effectively changed and thereby the mapping mode is changed (column 13-22).

It would have been obvious to one of ordinary skill in the art to have incorporated the Shum's warning message generation step because Xiong suggests a generating step of generating a synthesized image in accordance with the predetermined condition (Xiong column 3, lines 35-55; column 17, lines 15-67; column 18, lines 1-4). Moreover, Xiong teaches in figures 2 and 3 a user interface and a global optimization that provides feedback to the computer system such as issuing warning messages on the computer monitor 218 when the pair-wise objective function is

not desirable for a poor selection of the projection viewing plane (and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects) due to a poor selection of the projection viewing plane and the resulting panoramas will have imperfectly aligned images that give shadow or ghosting effects. Xiong also points to a seamless multi-resolution average blending method that would result in an absent of shadow effects (column 14, lines 1-45). Xiong further teaches a human interaction being present throughout the image synthesis process to provide feedback to the computer system in all the nonlinear optimizations to let users monitor the progress of the system and allow them to intervene when necessary and therefore the claimed limitation suggests an obvious modification of Xiong because providing feedback to users is similar to issuing a message to users in a user interaction with the nonlinear optimizations when the changing step does not comply with a predetermined condition set or user-selected parameter set.

One having the ordinary skill in the art would have been motivated to do this because this would have provided the user the informative message such as issuing a warning message through the user interaction when convergence to the predetermined condition setting cannot be obtained in the image synthesis (Xiong column 17, lines 15-67, column 18, lines 1-4) for non-solvable optimization problems (Shum column 18, lines 38-67).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (703) 605-1213. The examiner can normally be reached on 8:00 - 6:30 (Mon-Thu).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Razavi can be reached on (703) 305-4713. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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jcw

JEFFERY BRIER
PRIMARY EXAMINER